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Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/W.No.08/KNR/CSR-03/1085c/CEMENT/2015-16

Date: 03.03.2016

TEST REPORT ON CEMENT

*** CUSTOMER**	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
***AGENCY**	:	**Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
***NAME OF THE WORK**	:	Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.
***REFERENCE**	:	EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016
SAMPLE ID	:	Cement
SAMPLE RECEIVED ON	:	01.03.2016
PERIOD OF TESTING	:	01.03.2016 to 03.03.2016

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988(RA-2009)	27.50 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988(RA-2009)	145 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988(RA-2009)	460 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988(RA-2009)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

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****

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Job No.: CTCE/BBMP/W.No.08/KNR/CSR-03/1085c/SAND-Gradation/2015-16 : 03.03.2016

TEST REPORT ON DETERMINATION GRADATION OF FINE AGGREGATES

*** Customer** : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. K. Narasimha Raju,**
# 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.

*** Name of Work** : Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016

Technical Reference : IS : 2386 Part 1 - 1963 RA-2007

Sample ID : Fine Aggregates

Sample Received on : 01.03.2016

Date of Testing : 03.03.2016

Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	92.46	90-100	90-100	90-100	95-100
2.36	72.78	60-95	75-100	85-100	95-100
1.18	49.91	30-70	55-90	75-100	90-100
600 Micron	23.38	15-34	35-59	60-79	80-100
300 Micron	12.14	5-20	8-30	12-40	15-50
150 Micron	4.29	0-10	0-10	0-10	0-15

* Information is furnished by the Customer/Representative

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Remarks : This sample is under Zone-I specific limits.

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Job No.: CTCE/BBMP/W.No.08/KNR/CSR-03/1085c/AGG/GR/2015-16 : 03.03.2016

TEST REPORT ON DETERMINATION GRADATION OF COARSE AGGREGATES

*** Customer** : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. K. Narasimha Raju,**
# 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.

*** Name of Work** : Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016

Technical Reference : IS : 2386 Part 1 -1963 RA-2007

Sample ID : Coarse Aggregates (40mm)

Sample Received on : 01.03.2016

Date of Testing : 03.03.2016

Total Wt. of Aggregates in gms= **10000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)	
		Graded	Single Sized
80	100	100	-
63	100	-	100
40	96.48	95-100	85-100
20	39.36	30-70	0-20
10	17.17	10-35	0-5
4.75	1.33	0-5	-

* Information is furnished by the Customer/Representative

Remarks : This sample is under Graded specific limits.

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Job No.: CTCE/BBMP/W.No.08/KNR/STEEL/2015-16 03.03.2016

TEST REPORT ON REINFORCEMENT STEEL

Client	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	:	**Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
Name of the work	:	Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.
Reference	:	EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016
Date of Test	:	03.03.2016
Technical Reference	:	IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm²	Tensile strength (Ultimate stress) N/mm²	Elongation percent gauge length		
1	10	0.62	513	556	13.25	O.K	O.K

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Job No.: CTCE/BBMP/W.No.08/KNR/CSR-03/1085c/CUBE/2015-16 05.04.2016

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

*** Customer** : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. K. Narasimha Raju,**
# 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.

*** Name of the work** : Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.

*** Reference** : EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016

*** Sample ID** : Drain Concrete

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

*** Grade of Concrete** : M_{15}

Compressive Strength as on : 28^{th} day

Sample Received on : 05.04.2016

Sl.No.	* Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	08.03.2016	05.04.2016	8.296	348.6	15.49
2	08.03.2016	05.04.2016	8.357	366.9	16.31
3	08.03.2016	05.04.2016	8.418	372.8	16.57

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Job No.: CTCE/BBMP/W.No.08/KNR/CSR-03/1085c/CUBE/2015-16 11.04.2016

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

*** Customer** : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. K. Narasimha Raju,**
# 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.

*** Name of the work** : Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.

*** Reference** : EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016

*** Sample ID** : Drain Concrete

Size of cubes : 150mmx150mmx150mm

Cross Sectional Area : 22500 mm^2

Technical Reference : IS: 516-1959 (Reaffirmed 2008)

*** Grade of Concrete** : M_{20}

Compressive Strength as on : 28^{th} day

Sample Received on : 11.04.2016

Sl.No.	* Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	14.03.2016	11.04.2016	8.125	478.5	21.27
2	14.03.2016	11.04.2016	8.234	516.4	22.95
3	14.03.2016	11.04.2016	8.316	491.8	21.86

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18.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. K. Narasimha Raju,**
175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.

Name of Work : Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016

Date of Testing : 18.03.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **8760**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	355	355	4.1	95.9	95-100
22.4	2350	2705	30.9	69.1	60-80
11.2	1975	4680	53.4	46.6	40-60
4.75	1260	5940	67.8	32.2	25-40
2.36	925	6865	78.4	21.6	15-30
0.600	735	7600	86.8	13.2	8-22
0.075	820	8420	96.1	3.9	0-8

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Job No.: CTCE/BBMP/W.No.08/KNR/WMM/Gradation/2015-16

19.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. K. Narasimha Raju,**
175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.

Name of Work : Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016

Date of Testing : 19.03.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): 8840

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	285	285	3.2	96.8	95-100
22.4	2245	2530	28.6	71.4	60-80
11.2	1895	4425	50.1	49.9	40-60
4.75	1370	5795	65.6	34.4	25-40
2.36	955	6750	76.4	23.6	15-30
0.600	840	7590	85.9	14.1	8-22
0.075	775	8365	94.6	5.4	0-8

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Job No.: CTCE/BBMP/W.No.08/KNR/WMM/Gradation/2015-16

25.03.2016

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. K. Narasimha Raju,**
175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.

Name of Work : Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016

Date of Testing : 25.03.2016

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **8820**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	345	345	3.9	96.1	95-100
22.4	2365	2710	30.7	69.3	60-80
11.2	1915	4625	52.4	47.6	40-60
4.75	1425	6050	68.6	31.4	25-40
2.36	935	6985	79.2	20.8	15-30
0.600	760	7745	87.8	12.2	8-22
0.075	845	8590	97.4	2.6	0-8

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Job No.: CTCE/BBMP/W.No.08/KNR/WMM/AIV/2015-16

18.03.2016

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
Name of the Work	Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	18.03.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	384	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	84	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines	21.88	22.28	
	100* (W_2/W_1)%			**22.08**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.08/KNR/WMM/S-T/2015-16 18.03.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
Name of Work	Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	18.03.2016

Result : Flakiness Index = **11.53%**

Elongation Index = **13.28%**

Result : Combined Flakiness & Elongation index 24.81%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.08/KNR/SDBC/AIV/2015-16 26.03.2016

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
Name of the Work	Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	26.03.2016

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	381	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	81	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.26	22.08	21.67

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.08/KNR/SDBC/Shape_T/2015-16 : 26.03.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	: **Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
Name of Work	: Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.
Reference	: EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016
Technical Reference	: IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 26.03.2016

Result : Flakiness Index = **11.67%**

Elongation Index = **13.42%**

Result : Combined Flakiness & Elongation index **25.09%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.08/KNR/SDBC/Stripping/2015-16 26.03.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
Name of the work	Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	26.03.2016

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.2	3.40	96.60
2	3.4		
3	3.6		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

Note:

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Job No.: CTCE/BBMP/W.No.08/KNR/SDBC/Sp_Wa/2015-16 26.03.2016

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore - 94.
Name of the Work	Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	26.03.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2019	2018	2021	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1264	1263	1266	
4	Weight of saturated surface dry aggregate in air	W_3 g	2016	2015	2014	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	752	752	748	
6	Weight of oven dried aggregate	W_4 g	2000	2001	2002	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.660	2.661	2.676	2.666
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.717	2.711	2.720	2.716
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.80%	0.70%	0.60%	0.70%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.08/KNR/SDBC/Bitumen/2015-16 26.03.2016

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX AASHTO T 164 & AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. K. Narasimha Raju,** # 175, 5th Cross, Badrappa Layout, Near G.R. Kalyana Mantapa, Bangalore -
NAME OF THE WORK	Improvements to roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08, Kodigehalli Sub Division., BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/215/2015-16 Dated: 16.02.2016
SAMPLE I/D	Roads and drains at Papanna Badavane near GR Kalyana Mantapa in Ward No. 08
DATE OF TESTING	26.03.2016

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	26.00
7. Bitumen content in %	5.00	5.20
8. Average	**5.10**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	35.26	7.42	7.42	92.58	90-100
4.75	252.41	53.14	60.56	39.44	35-51
2.36	57.84	12.18	72.74	27.26	24-39
1.18	42.13	8.87	81.61	18.39	15-30
0.3	29.65	6.24	87.85	12.15	9-19
0.075	28.13	5.92	93.77	6.23	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	27.45	5.49	5.49	94.51	90-100
4.75	243.82	48.76	54.25	45.75	35-51
2.36	92.56	18.51	72.77	27.23	24-39
1.18	52.36	10.47	83.24	16.76	15-30
0.3	32.48	6.50	89.73	10.27	9-19
0.075	25.61	5.12	94.86	5.14	3-8

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